SN. 10/808,209 ATTORNEY DOCKET NO. SANA:007

IN THE CLAIMS

The status of the claims as presently amended is as follows:

1. (*Currently Amended*) An exhaust gas purifying system comprising:

an oxidation catalyst disposed in an exhaust passage of an engine;

a filter disposed in said exhaust passage at a position downstream of said oxidation catalyst to collect a particulate matter contained in exhaust gas;

a regeneration start determining means for determining a regeneration start of said filter;

a regenerator means for regenerating said filter;

an oxygen mass flow rate detecting means for detecting or calculating a mass flow rate of oxygen fed to said filter; and

a regeneration end determining means for determining a regeneration end of said filter ~~in accordance with information provided from~~ based on the mass flow rate detected or calculated by said oxygen mass flow rate detecting means,

wherein said regeneration end determining means determines the regeneration end of said filter ~~when and upon arrival of~~ an integrated value of said oxygen mass flow rate ~~at~~ reaches a predetermined value during regeneration of said filter by said regenerator means.

2. (*Original*) An exhaust gas purifying system according to claim 1, further comprising a temperature detecting means for detecting the temperature of said filter, and

wherein said regeneration end determining means determines a regeneration end of said filter in accordance with information provided from said temperature detecting means and said oxygen mass flow rate detecting means and upon arrival at a predetermined value of an integrated value of said oxygen mass flow rate from the time when the temperature of said filter has reached a predetermined temperature.

3. (*Currently Amended*) An exhaust gas purifying system according to claim 1, wherein said regeneration end determining means determines a regeneration end of said filter upon establishment of the following equation:

$$\Sigma\Delta PM = C \cdot \Sigma (\text{oxygen mass flow rate}),$$

where[[,]] $C = A \cdot PM \cdot e^{(-E/RT)},$

$\Sigma\Delta PM$: target combustion quantity of particulate matter,

Σ (oxygen mass flow rate): integrated value of a mass flow rate of oxygen fed to the filter,

A: constant obtained by experiment (frequency factor),

3

PM: amount of particulate matter deposited on the filter at the beginning of

regeneration,

E: activation energy constant,

R: gas constant, and

T: filter temperature.

4. (*Currently Amended*) An exhaust gas purifying system according to claim 1, further comprising an air flow sensor for detecting a flow rate of intake air, and

wherein said oxygen mass flow rate detecting means calculates the oxygen mass flow rate O_{2w} in accordance with the following equation including the mass flow rate of intake air Q_{aw} obtained from said air flow sensor:

$$O_{2w} = (Q_{aw} - q \cdot a) \cdot b,$$

where[[,]] q: fuel injection quantity,

a: equivalence ratio, and

b: oxygen mass ratio.

5. (*Original*) An exhaust gas purifying system according to claim 1, further comprising:

an O_2 sensor disposed between said oxidation catalyst and said filter to detect an oxygen concentration; and

a sensor for detecting the flow rate of fluid entering said filter, and

wherein the oxygen mass flow rate detecting means calculates the oxygen mass flow rate O_{2w} on the basis of detection results provided from said two sensors.

6. (*Currently Amended*) An exhaust gas purifying system according to claim 1, wherein:

~~wherein~~ said regeneration end determining means has a combustion quantity estimating means for calculating or estimating a combustion quantity of the particulate matter collected by said filter,

~~wherein~~ said combustion quantity estimating means calculating or estimating a combustion quantity of the particulate matter by multiplying the integrated value of the oxygen mass flow rate obtained from said oxygen mass flow rate detecting means by a predetermined coefficient, and

~~wherein~~ the end of regeneration of said filter is determined upon arrival at a predetermined target value of the combustion quantity of the particulate matter calculated or estimated by said combustion quantity estimating means.

4

7. (*Currently Amended*) An exhaust gas purifying system according to claim 6, wherein:
~~wherein~~ said regeneration start determining means has a deposition quantity estimating means for calculating or estimating a deposition quantity of the particulate matter deposited on said filter, and
~~wherein~~ said predetermined target value is a deposition quantity of the particulate matter at the beginning of the regeneration which is estimated by said deposition quantity estimating means.

8. (*Original*) An exhaust gas purifying system according to claim 2, wherein said temperature detecting means is a temperature sensor disposed downstream of said catalyst, and an outlet temperature of said catalyst is used as the temperature of said filter.

9. (*Currenty Amended*) An exhaust gas purifying system according to claim 2, wherein:
~~wherein~~ said temperature detecting means comprises temperature sensors disposed upstream and downstream respectively of said filter to detect an inlet temperature Tf and an outlet temperature Tr of the filter, and
~~wherein~~ said temperature detecting means calculates a filter temperature on the basis of the inlet temperature Tf and the outlet temperature Tr detected by said temperature sensors and in accordance with the following equation:
Filter temperature $T_{fil} = Tf \cdot a + Tr (1 - a)$,
where[[,]] a: a value for weighting the inlet temperature Tf and the outlet temperature Tr, satisfying the relation of $0 \leqq a \leqq 1$.

10. (*Original*) An exhaust gas purifying system according to claim 1, wherein said regeneration end determining means determines the end of regeneration only during forced regeneration of said filter.

11. (*Original*) An exhaust gas purifying system according to claim 1, wherein said engine is a diesel engine.

12. (*Currently Amended*) A regeneration end determining method for an exhaust gas purifying system comprising an oxidation catalyst disposed in an exhaust passage of an engine and a

5

filter disposed in the exhaust passage at a position downstream of said oxidation catalyst to collect a particulate matter contained in exhaust gas, said method comprising the steps of:

starting a forced regeneration of said filter;

determining whether the temperature of said filter has reached a predetermined temperature or not during execution of said forced regeneration;

determining whether an integrated value of an oxygen mass flow rate, from the time-point of ~~arrival of~~ the filter temperature ~~at~~ reaching the predetermined temperature during execution of said forced regeneration, has reached a predetermined value or not; and

terminating said forced regeneration ~~upon arrival of~~ when the integrated value of said oxygen mass flow rate ~~at~~ reaches the predetermined value.

13. (*Currently Amended*) A regeneration end determining method for an exhaust gas purifying system comprising an oxidation catalyst disposed in an exhaust passage of an engine and a filter disposed in the exhaust passage at a position downstream of said oxidation catalyst to collect a particulate matter contained in exhaust gas, said method comprising the steps of:

determining whether a forced regeneration of said filter is being executed or not;

determining whether the temperature of said filter has reached a predetermined temperature or not during execution of said forced regeneration;

determining whether an integrated value of an oxygen mass flow rate, from the time-point of ~~arrival of~~ the filter temperature ~~at~~ reaching the predetermined temperature during execution of said forced regeneration, has reached a predetermined value or not; and

terminating said forced regeneration ~~upon arrival of~~ when the integrated value of said oxygen mass flow rate ~~at~~ reaches the predetermined value.

6